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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/724,006	11/26/2003	Alexei A. Erchak	16459-009001	7539
26161	7590	05/23/2005	EXAMINER	
FISH & RICHARDSON PC 225 FRANKLIN ST BOSTON, MA 02110			NADAV, ORI	
			ART UNIT	PAPER NUMBER
			2811	
DATE MAILED: 05/23/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/724,006

Applicant(s)

ERCHAK ET AL.

Examiner

ori nadav

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 13 April 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1,3-7,9-28 and 36-58 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-7,9-28 and 36-58 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 November 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>03/24/05</u> | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Drawings*

Figure 23 was received on 04/13/2005. Figure 23 is objected to since it depicts a device which was not described in the specification.

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, a material that is substantially transparent to light that emerges from the light-emitting device, as recited in claim 6, and a packaged device wherein first and second sheets forming a portion of a packaged device, as recited in claims 3-4, 37, 41 and 52, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New

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Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 24 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. There is no support in the embodiment of figure 14 for a pattern extending beyond the first layer, as recited in claims 24 and 57.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3-7, 9-28 and 36-58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krames et al. (5,779,924) in view of Heremans et al. (6,504,180) and Schofield et al. (6,690,268).

Krames et al. teach in figure 12 and related text a light-emitting device, comprising:

a multi-layer stack of materials including a light-generating region 2 and a first layer 1 (the layer between substrate 3 and region 2) supported by the light-generating region, a surface of the first layer being configured so that light generated by the light-generating region can emerge from the light-emitting device via the surface of the first layer, the surface of the first layer having a dielectric function that varies spatially according to a pattern; and

a transparent material 12 supported by the surface of the first layer,

wherein sidewalls of the light-emitting device are substantially devoid of the phosphor material.

Krames et al. do not teach a phosphor material disposed on the surface of the first layer.

Heremans et al. teach a transparent layer comprising phosphor material in order to change the wavelength of the diode (column 23, lines 55-58).

Schofield et al. teach using a phosphor-mixed transparent material in order to achieve a high luminosity and low power consumption light source. ("A white light emitting diode (LED) that is thermostable is available from Toshiba America Electronic Components, Inc. of Irvine, Calif., Part Number: TLWA1100. The thermostable white light LED integrates multiple colored phosphors and a short peak wavelength (preferably,

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approximately 380 nanometers (nm) in peak spectral output intensity) light emitting diode junction in a phosphor-mixed transparent resin package to achieve a high luminosity, low power consumption light source.”).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a transparent layer comprising phosphor material in Krames et al.’s device in order to use the device in an application which requires specific diode wave length, and in order to improve the characteristics of the device.

Regarding claims 2-14, 16-23, 25-28, 38-43, 45-56 and 58, prior art teaches an LED comprising a phosphor material disposed on the surface of the first layer, wherein

the light-emitting device is in the form of a packaged die that is free of an encapsulant, wherein

a layer comprising a material that is substantially transparent to light that emerges from the light-emitting device,

wherein at least some of the phosphor material is disposed within the layer that comprises the material that is substantially transparent to light that emerges from the light-emitting device, wherein

a material 13 having an index of refraction of at most about 1.5 disposed between the surface of the first layer and the layer that comprises the material that is substantially transparent to light that emerges from the light-emitting device, and

a support 3 that supports the multi-layer stack of materials, wherein

a layer of reflective material that is capable of reflecting at least about 50% of light generated by the light-generating region that impinges on the layer of reflective material, the layer of reflective material being between the support and the multi-layer stack of materials, wherein

the reflective material is a heat sink material configured so that the heat sink material has a vertical heat gradient during use of the light-emitting device, wherein

electrical contacts 4 configured to inject current into the light-emitting device, wherein the electrical contacts are configured to vertically inject electrical current into the light-emitting device, wherein the pattern has an ideal lattice constant and a detuning parameter with a value greater than zero and does not extend into the light-generating region and the first layer,

and a layer of reflective material that is capable of reflecting at least about 50% of light generated by the light-generating region that impinges on the layer of reflective material, wherein the light-generating region is between the layer of reflective material and the first layer, wherein the phosphor material is in the form of a layer,

and a thickness of the layer of the phosphor material varies by less than about 20%, wherein

a gas is present between the multi-layer stack of materials and the first sheet, wherein the gas comprises air, wherein

the surface of the first layer has features with a size of less than about  $J/5$ , where  $J$  is a wavelength of light that can be generated by the light-generating region and that can emerge from the light-emitting device via the surface of the first layer.

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Regarding claim 36, prior art teaches a phosphor material configured so that light generated by the light-generating region that emerges via the surface of the first layer interacts with the phosphor material so that light that emerges from the phosphor layer is substantially white light, wherein a ratio of a height of the light-emitting device to an area of the light-emitting device is sufficiently small enough for the white light to extend in all directions.

Regarding claim 37, prior art teaches a first sheet comprising a material that is substantially transparent to light that emerges from the light-emitting device; and a second sheet comprising a phosphor material, the second sheet being adjacent the first sheet, wherein the light-emitting device is packaged. It would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a first and second sheets to form a portion of the package for the light-emitting device in prior art's device, in order to simplify the processing steps of making the device by using the first and second sheets to form a portion of the package for the light-emitting device.

Regarding claim 15, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a current-spreading layer between the first layer and the light-generating region in prior art's device in order to improve the characteristics of the device.



Regarding claims 24, 57 and 44, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use a pattern extending beyond the first layer and a pressure of the gas being less than about 100 Torr, in prior art's device in order to use the device in an application which requires specific pattern and specific gas pressure, respectively.

### ***Response to Arguments***

Applicant argues that figure 14 and the specification (page 8, lines 8-14) provide support for a material that is substantially transparent to light that emerges from the light-emitting device, as recited in claim 6.

The passage recited in the specification in page 8, lines 8-14, is not directed to the embodiment of figure 14. Furthermore, figure 14 does not depict a material that is substantially transparent to light that emerges from the light-emitting device, as recited in claim 6.

Applicant argues that a packaged device is shown in figures 1 and 23.

Applicant did not elect figures 1 and 23 for examination. Applicant elected figure 14 for examination. Figure 14 does not depict a packaged material.

Applicant argues that there is support in the specification (page 31, lines 24-29) for a pattern extending beyond the first layer, as recited in claim 24.

Although the specification (page 31, lines 24-29) recites a pattern extending beyond the first layer, there is no support in the embodiment of figure 14 for a pattern extending beyond the first layer, as recited in claim 24.

Applicant argues that prior art does not teach a phosphor material disposed on the surface of the first layer, and the examiner must explain the pertinence of each reference and designate the particular part of the reference where the subject matter is allegedly disclosed.

Krames et al. do not teach a phosphor material disposed on the surface of the first layer.

Heremans et al. teach in column 23, lines 55-58, a transparent layer comprising phosphor material in order to change the wavelength of the diode.

Schofield et al. teach in paragraph 327 using a phosphor-mixed transparent material in order to achieve a high luminosity and low power consumption light source (paragraph 327 recites: "A white light emitting diode (LED) that is thermostable is available from Toshiba America Electronic Components, Inc. of Irvine, Calif., Part Number: TLWA1100. The thermostable white light LED integrates multiple colored phosphors and a short peak wavelength (preferably, approximately 380 nanometers (nm) in peak spectral output intensity) light emitting diode junction in a phosphor-mixed transparent resin package to achieve a high luminosity, low power consumption light source.").

Applicant argues that prior art does not teach a ratio of a height of the light-emitting device to an area of the light-emitting device is sufficiently small enough for the white light to extend in all directions.

Prior art teaches using a device comprising white light. Claim 36 recites a ratio of a height of the light-emitting device to an area of the light-emitting device is sufficiently small enough for the white light to extend in all directions. The term "area" was not defined by applicant in such a way as to be restricted to a specific area. Therefore, any area in the LED can be chosen to meet the limitations of a ratio of a height of the light-emitting device to an area of the light-emitting device is sufficiently small enough for the white light to extend in all directions.

Applicant argues that prior art does not teach using a first and second sheets to form a portion of the package for the light-emitting device.

There is no specific description in the elected embodiment of figure 14 for a packaged device.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

**Papers related to this application may be submitted to Technology center (TC) 2800 by facsimile transmission. Papers should be faxed to TC 2800 via the TC 2800 Fax center located in Crystal Plaza 4, room 4-C23. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The Group 2811 Fax Center number is (703) 308-7722 and 308-7724. The Group 2811 Fax Center is to be used only for papers related to Group 2811 applications.**

Any inquiry concerning this communication or any earlier communication from the Examiner should be directed to *Examiner Nadav* whose telephone number is (571) 272-1660. The Examiner is in the Office generally between the hours of 7 AM to 4 PM (Eastern Standard Time) Monday through Friday.

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Any inquiry of a general nature or relating to the status of this application should be directed to the **Technology Center Receptionists** whose telephone number is **308-0956**

A handwritten signature in black ink, appearing to read 'Ori Nadav', written in a cursive style.

O.N.  
5/19/05

ORI NADAV  
PRIMARY EXAMINER  
TECHNOLOGY CENTER 2800